Research Paper | Education | E-ISSN No : 2454-9916 | Volume : 3 | Issue : 5 | May 2017

WEB BASED INSTRUCTION VERSUS CLASSROOM BASED INSTRUCTION: A COMPARISON OF ACHIEVEMENT IN MATHEMATICS OF CLASS IX STUDENTS

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ABSTRACT

The present study was completed on class IX students of Jawahar Navodaya Vidyalayas of Madhya Pradesh and Chattisgarh . 316 students were selected as sample by using random sampling technique. Using " Self developed Achievement Test in Mathematics" it is found that the (i) Web Based Instruction was found to be significantly superior to Traditional Method for teaching Mathematics when the groups were matched with respect to pre achievement in Mathematics. (ii) Achievement in Mathematics of Boys and Girls was found to be equally well when the groups were matched with respect to pre Achievement in Mathematics. (iii) There is no significant effect of the interaction between Treatment and Gender when the groups were matched with respect to pre Achievement in Mathematics. (iv) Achievement in Mathematics is independent of Caste when the groups were matched with respect to pre Achievement in Mathematics.(v) Achievement in Mathematics is independent of the interaction between Treatment and Caste when the groups were matched with respect to pre Achievement in Mathematics.

INTRODUCTION

At school education level, different Methods of Teaching namely, Lecture Method; Interactive Methods: Discussion Method, Seminar Method & Tutorial Method; Project Methods: Field, Laboratory, & Library; Self-Study Methods: Programmed Learning, Computer Aided Instruction, Personalized Instruction, Online Learning, E-Learning; Web Based Instruction and Other Method: Team Teaching and Models of Teaching are available. Amongst all these, Lecture Method is mostly used by majority of teachers. This method is not very useful. It is very appropriate for giving more information in less time and when the size of class is too large. It cannot develop higher mental abilities, like, Understanding, Application, Analysis, Classification, etc. Lecture Method cannot be used to teach complex concepts. It only makes the teacher active and student a passive learner. Neither students nor teachers are happy with the Lecture Method. The researchers always try to develop some ways to improve the Teaching – Learning Process.

At present in formal education systems the topics have to be studied by the students on that specific day, in specific classroom and specific term. The topics and subjects cannot be studied on a different day or in a different place. The students have to be in the specified classroom in that term, and even in the specified week and time (Arslan, 2002, p.34). Thus, there is a need to change the teaching – learning process at school level.

In the new technology era, the role of teacher is changing continuously from being an instructor to constructor, facilitator, and creator of learning situations. A teacher can integrate the use of ICT into teaching effectively if he has been trained in its use. Thus, there is a need to create facility and arrange training program for the use of ICT. Web Based Instruction, which is an emerging field in education, is nevertheless, a part of rapid growth that is the internet.

KEY WORDS

In this study the major key words used are as follows:-

WEB BASED INSTRUCTION

Web-Based Instruction refers to providing a learning environment that is mediated and supported via the Internet/Intranet and connected to a computer with hyperlinks to resources outside the instructional domain. The instruction is designed so that the computer displays lessons in response to learner/user interactions. (Farid, 2008).

JAWAHAR NAVODAYA VIDYALAYA

Jawahar Navodaya Vidyalayas known as JNV are Indian schools for talented children and form a part of the system of gifted education. The objectives of the scheme are to provide good quality modern education to the children predominantly from rural areas, without regard to their family's socio-economic condition.

ACHIEVEMENT

The level of educational development of an individual as determined by an achievement test and based on a comparison of his score with the average score of individuals of the same chronological age.

CASTE

On the basis of their caste the students are classified into four categories. General, Other Backward Class, Scheduled Caste and Scheduled Tribe Caste.

OBJECTIVES

The following were the objectives of this study:-

1. To study the effect of Treatment, Gender and their interaction on Achievement in Mathematics by considering pre Achievement in Mathematics as covariate.
2. To study the effect of Treatment, Caste and their interaction on Achievement in Mathematics by considering pre Achievement in Mathematics as covariate.

HYPOTHESES

The hypotheses were worded as given below:-

1. There is no significant effect of Treatment, Gender and their interaction on Achievement in Mathematics by considering pre Achievement in Mathematics as covariate.
2. There is no significant effect of Treatment, Caste and their interaction on Achievement in Mathematics by considering pre Achievement in Mathematics as covariate.

METHODS

The methods adopted in the study are sample, sampling technique, Experimental Design, Tools and data analysis.

SAMPLE

The population of the study was Class IX students studying in Jawahar Navodaya Vidyalayas of different Schools in India. The present study was Experimental in nature and conducted in eight Jawahar Navodaya Vidyalayas, namely, Jawahar Navodaya Vidyalaya Mana,Raipur (C.G.), Jawahar Navodaya Vidyalaya Padmi, Mandla (M.P), Jawahar Navodaya Vidyalaya Kurud, Dhamtari (C.G.), Jawahar Navodaya Vidyalaya Kanhiwada,Seoni (M.P), Jawahar Navodaya Vidyalaya Shahpur,Dindori (M.P), Jawahar Navodaya Vidyalaya Borai, Durg (C.G.), Jawahar Navodaya Vidyalaya Dongargarh, Rajnandgaon (C.G.). 316 students of class IX of the above-mentioned JNVs of Madhya Pradesh and Chhattisgarh were selected as sample by random sampling technique. 40 students were selected from each school but four students of two schools dropped out during the course of treatment. Finally 159 students from four schools formed experimental group and 157 students from four other schools formed control group. School wise and Gender wise distribution of subjects is given in Table (1).

Table 1: School wise, Gender wise and Group wise Sample

S. N.	Name of the School	Boys	Girls	Total
1.	Jawahar Navodaya Vidyalaya Mana,Raipur (C.G.)	23	16	39
2.	Jawahar Navodaya Vidyalaya Padmi, Mandla (M.P)	25	15	40
3.	Jawahar Navodaya Vidyalaya Kurud, Dhamtari (C.G.)	20	20	40
4.	Jawahar Navodaya Vidyalaya Kanhiwada,Seoni (M.P)	20	20	40
5.	Jawahar Navodaya Vidyalaya Shahpur,Dindori (M.P)	23	14	37
6.	Jawahar Navodaya Vidyalaya Borai, Durg (C.G.)	21	19	40
7.	Jawahar Navodaya Vidyalaya Dongargarh, Rajnandgaon (C.G.)	26	14	40
8.	Jawahar Navodaya Vidyalaya Bargi, Jabalpur (M.P)	22	18	40
Total		180	136	316

EXPERIMENTAL DESIGN

The present study was experimental in nature. The study designed on the basis of pre-Test, Post-Test Control Group Design. As per Campbell and Stenley (1963), the lay out of this design is as given under:

R O X O

R O O

Where
R = Random selection of sample
O = Observation
X = Treatment

TOOLS

In this study, following tools were used for data collection:-

ACHIEVEMENT TEST

Authors is developed and validates the Achievement test in Mathematics based on the Web Based Instructional material. For establishment of validity of the achievement test Content validity method was used. This achievement test consisted of short answers and objective type questions .This test comprises of 30 questions related to few topics of Mathematics. Each objective type question has four alternatives in which one option is true and others are wrong. For each correct answer of the short answer type questions 4 marks were given, while, 1 mark was given to the correct answer of objective type question. Thus, the total marks were 60. Maximum time limit for this Achievement Test was decided as one hour.

The content validity involves essentially the systematic examination of contents of the Achievement Test to determine whether it covers a representative content of the Achievement to be measured. The content validity of the Achievement Test was established by having a discussion with the five experts from the field of Mathematics and three experts from the field of Methods of Teaching Mathematics. On the basis of expert's opinion, the Achievement Test was found to be valid.

DATA ANALYSIS

The objective-wise data analyses techniques used are given below:-

1. Two- Way- ANCOVA was used for studying the effect of Treatment, Gender and their interaction on Achievement in Mathematics by considering pre Achievement in Mathematics as covariate.

2. Two- Way- ANCOVA was used for studying the effect of Treatment, Caste and their interaction on Achievement in Mathematics by considering pre Achievement in Mathematics as covariate.

RESULT AND DISCUSSION

(a) Study of the effect of Treatment, Gender and their interaction on Achievement in Mathematics by considering pre Achievement in Mathematics as covariate.

Table 2 : Summary of 2×2 Factorial Design ANCOVA of Treatment, Gender and their interaction on Achievement in Mathematics by considering pre Achievement in Mathematics as covariate.

Source of Variance	df	SSy.x	$MSS_{y..x}$	$F_{y.x}$	Remark
Treatment	1	461.886	461.886	10.62	p< 0.01
Gender	1	12.829	12.829	0.295	p>0.05
Treatment * Gender	1	40.99	40.99	0.943	p>0.05
Error	311	13525.222	43.489		
Total	315				

From Table (2), it is evident that the adjusted F - value for Treatment with df = 1/311 is 10.62 which is significant at the 0.01 level of significance. It indicates that the adjusted mean scores of Achievement in Mathematics of Experimental Group and Control Group by considering pre Achievement in Mathematics as covariate differ significantly. Therefore the null hypothesis "There is no significant effect of Treatment on Achievement in Mathematics by considering pre Achievement in Mathematics as covariate" is rejected. Further it can be seen that the adjusted mean scores of Achievement in Mathematics of WBI Group is 46.5, which is significantly higher than the adjusted mean scores of Achievement in Mathematics of Traditional Method Group, which is 44.1. It may, therefore, be said that Web Based Instruction was found to be significantly superior to Traditional Method for teaching Mathematics when the groups were matched with respect to pre Achievement in Mathematics.

Further From the Table (2), it is evident that the adjusted F-value for Gender is 0.295 with df = 1/311 which is not significant at 0.05 level of significance. It means that the adjusted mean scores of Achievement in Mathematics of Boys and Girls did not differ significantly when pre Achievement in Mathematics was taken as covariate. So there was no significant effect of Gender on Achievement in Mathematics by considering pre Achievement in Mathematics as covariate. Therefore the null hypothesis "There is no significant effect of Gender on Achievement in Mathematics by considering pre Achievement in Mathematics as covariate" is not rejected. It may, therefore, be said that Achievement in Mathematics of Boys and Girls was found to be equally well, when the groups were matched with respect to pre Achievement in Mathematics.

The adjusted F-value for the interaction between Treatment and Gender as obtained from the Table (2) is 0.943 with df = 1/311 which is not significant at 0.05 level of significance. Therefore the null hypothesis "There is no significant effect of interaction between Treatment and Gender on Achievement in Mathematics by considering pre Achievement in Mathematics as covariate" is not rejected. It may, therefore, be concluded that there is no significant effect of the interaction between Treatment and Gender when the groups were matched with respect to pre Achievement in Mathematics.

(b) Study of the effect of Treatment, Caste and their interaction on Achievement in Mathematics by considering pre Achievement in Mathematics as covariate.

Table(3): Summary of 2×4 Factorial Design ANCOVA of Treatment, Caste and their interaction on Achievement in Mathematics by considering pre Achievement in Mathematics as covariate.

Source of Variance	df	SSy.x	$MSS_{y..x}$	$F_{y.x}$	Remark
Treatment	1	232.339	232.339	5.434	p< 0.01
Caste	3	264.383	88.128	2.06	p>0.05
Treatment* Caste	3	206.467	68.822	1.61	p>0.05
Error	307	13126.028	42.756		
Total	315				

The result in respect of effect of Treatment on Achievement in Mathematics by considering pre Achievement in Mathematics as covariate is same as given in Caption (a).

Further from the Table (3) it is also evident that the adjusted F-value for Caste is 2.06 with df = 3/307 which is not significant at the 0.05 level of significance. Therefore the null hypothesis "There is no significant effect of Caste on Achievement in Mathematics by considering pre Achievement in Mathematics as covariate" is not rejected. It can thus be concluded that the Achievement in Mathematics is independent of Caste when the groups were matched with respect to pre Achievement in Mathematics.

The adjusted F-value for the interaction of Treatment and Caste as obtained from the Table (3) is 1.61 with df = 3/307 which is not significant at the 0.05 level of significance. Therefore the null hypothesis "There is no significant effect of interaction of Treatment and Caste on Achievement in Mathematics by considering pre Achievement in Mathematics as covariate" is not rejected. It can thus be concluded that the Achievement in Mathematics is independent of the interaction between Treatment and Caste when the groups were matched with respect to pre Achievement in Mathematics.

FINDINGS

The Findings of this research were as follows:-

1. Web Based Instructional Material was found to be significantly superior to Traditional Method for teaching Mathematics when the groups were matched with respect to pre Achievement in Mathematics.

2. Achievement in Mathematics of Boys and Girls was found to be equally well when the groups were matched with respect to pre Achievement in Mathematics.

3. There is no significant effect of the interaction between Treatment and Gender when the groups were matched with respect to pre Achievement in Mathematics.

4. Achievement in Mathematics is independent of Caste when the groups were matched with respect to pre Achievement in Mathematics.

5. Achievement in Mathematics is independent of the interaction between Treatment and Caste when the groups were matched with respect to pre Achievement in Mathematics.

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